

A 3-D Miniature LIDAR System for Mobile Robot Navigation, Phase I

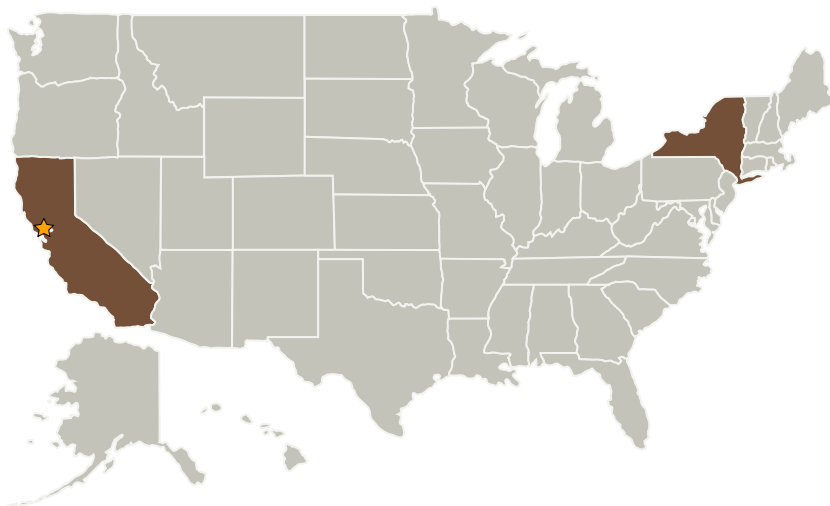
Completed Technology Project (2008 - 2008)



Project Introduction

Future lunar initiatives will demand sophisticated operation of mobile robotics platforms. In particular, lunar site operations will benefit from robots, both autonomous and tele-operated, that complement or replace human extravehicular activity (EVA). Three-dimensional sensing technology is at the heart of such functionality, enabling safe and reliable navigation in complex, dynamic environments, and serving as a valuable tool for inspection and site survey. Honeybee Robotics therefore proposes to develop a small-envelope, high-performance scanning LIDAR (LIght Detection and Ranging) system, geared primarily towards mobile robot navigation, and secondarily to site inspection and survey. The proposed device would draw on the results of a design study conducted by Honeybee, under contract to DARPA, to develop a miniature LIDAR for a serpentine robotic platform. The baseline Honeybee 3D Miniature LIDAR (3DML) design uses an innovative scanning mechanism in conjunction with a pulse-time-of-flight optical rangefinding subsystem. The 3DML design, developed with expert input from Sensor Designs, Inc., an Oregon-based electro-optical systems consultancy, achieves a wide field of view and high resolution while maintaining an ultra-compact package size. Phase I of this SBIR effort will focus on proof-of-concept of the opto-mechanical system through prototyping and test. Phase II will include development of a fieldable brassboard system prototype and a full path-to-flight study. Phase III will include commercialization of a 3DML unit for terrestrial research, and incorporation of 3DML into a flight program. As an experienced developer of miniature electromechanical systems for spaceflight, Honeybee is well-positioned to flight-qualify 3DML in Phase III.

Primary U.S. Work Locations and Key Partners



A 3-D Miniature LIDAR System for Mobile Robot Navigation, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

A 3-D Miniature LIDAR System for Mobile Robot Navigation, Phase I



Completed Technology Project (2008 - 2008)

Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Honeybee Robotics, Ltd.	Supporting Organization	Industry	Pasadena, California

Primary U.S. Work Locations

California	New York
------------	----------

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael Rutberg

Technology Areas

Primary:

- TX04 Robotic Systems
 - └ TX04.1 Sensing and Perception
 - └ TX04.1.1 Sensing for Robotic systems